L

label: **1.** An identifier within or attached to a set of data elements. **2.** One or more characters that (a) are within or attached to a set of data elements and (b) represent information about the set, including its identification. **3.** In communications, information within a message that is used to identify specific system parameters, such as the particular circuit with which the message is associated. *Note:* Messages that do not relate to call control should not contain a label. **4.** In programming languages, an identifier that names a statement. **5.** An identifier that indicates the sensitivity of the attached information. **6.** For classified information, an identifier that indicates (a) the security level of the attached information or (b) the specific category in which the attached information belongs.

labeled channel: In integrated services digital networks, (ISDN), a time-ordered set of all block payloads that have labels containing the same information, *i.e.*, containing the same identifiers.

labeled interface structure: In integrated services digital networks (ISDN), an interface structure that provides telecommunications services and signaling by means of labeled channels.

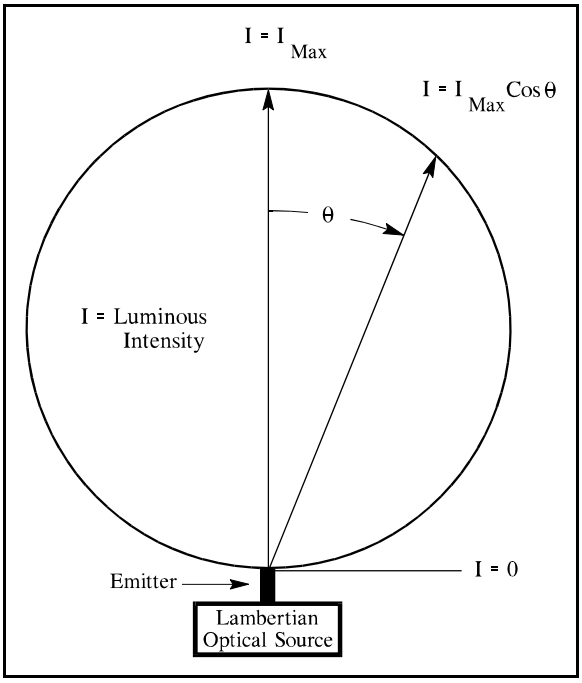
labeled multiplexing: In integrated services digital networks (ISDN), multiplexing by concatenation of the blocks of the channels that have different identifiers in their labels.

labeled statistical channel: In integrated services digital networks (ISDN), a labeled channel in which the block payloads or the duration of each successive block is random.

Lambertian radiator: *See* **Lambert's cosine law.**

Lambertian reflector: *See* **Lambert's cosine law.**

Lambertian source: An optical source that obeys Lambert's cosine law. (188) *Note:* Conventional (surface-emitting) LEDs approximate a Lambertian source. They have a large beam divergence, and a radiation pattern that approximates a sphere. Thus, most of their total optical output is not coupled into communications fibers.



Lambertian optical source

Lambert's cosine law: The mathematical statement that the radiance of certain idealized optical sources is directly proportional to the cosine of the angle—with respect to the direction of maximum radiance—from which the source is viewed. *Note:* Lambert's cosine law may also apply to certain idealized diffuse reflectors. *Synonyms* **cosine emission law, Lambert's emission law.**

Lambert's emission law: *Synonym* **Lambert's cosine law.**

LAN: *Acronym for* **local area network.**

LAN application (software): An application software package specifically designed to operate in a local-area-network environment.

land line: A colloquial name for conventional telephone facilities. *Note:* Land lines include conventional twisted-pair lines, carrier facilities, and microwave radio facilities for supporting a conventional telephone channel, but do not include satellite links or mobile telephone links using radio transmissions.

land mobile-satellite service: A mobile-satellite service in which mobile Earth stations are located on land. [NTIA] [RR]

land mobile service: A mobile service between base stations and land mobile stations, or between land mobile stations. [NTIA] [RR]

land mobile station: A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent. [NTIA] [RR]

landscape mode: **1.** In facsimile, the mode for scanning lines across the longer dimension of a rectangular object, *i.e.*, rectangular original. **2.** In computer graphics, the orientation of an image in which the longer dimension is horizontal. **3.** An orientation of printed text on a page such that the lines of text are parallel to the long dimension of the page. *Note:* If the page contains an image, such as a picture, and the page is viewed in the normal manner, the long dimension of the page would be parallel to the line that joins the eyes of the viewer.

land station: A station in the mobile service not intended to be used while in motion. [NTIA] [RR]

language: A set of characters, conventions, and rules that is used for conveying information. (188)

language processor: A program that performs tasks, such as translating and interpreting, required for processing a specified programming language. *Note:* Examples of language processors include a Fortran processor and a COBOL processor.

LAN operating system: *See* **network operating system.**

LAP-B: The Data Link Layer protocol as specified by CCITT Recommendation X.25 (1989).

LAP-D: *Abbreviation for* **link access procedure D.** A link protocol used in ISDN.

laser: *Acronym for* **light amplification by stimulated emission of radiation.** A device that produces a coherent beam of optical radiation by stimulating electronic, ionic, or molecular transitions to higher energy levels so that when they return to lower energy levels they emit energy. *Note 1:* Laser radiation may be either temporally coherent, spatially coherent, or both. *Note 2:* The degree of coherence of laser radiation exceeds 0.88. (188)

laser chirp: An abrupt change of the center wavelength of a laser, caused by laser instability.

laser diode: *Synonym* **injection laser diode.**

laser disk: *See* **optical disk.**

laser intelligence (LASINT): Technical and geolocation intelligence derived from laser systems; a subcategory of electro-optical intelligence. [JP1]

laser medium: *Synonym* **active laser medium.**

lasing: *See* **laser.**

lasing threshold: The lowest excitation level at which laser output is dominated by stimulated emission rather than by spontaneous emission.

LASINT: *Acronym for* **laser intelligence.**

last-in first-out (LIFO): A queuing discipline in which entities in a queue leave in the reverse order of the sequence in which they arrive. *Note:* Service, when available, is offered to the entity that has been in the LIFO queue the shortest time.

LATA: *Acronym for* **local access and transport area.**

lateral offset loss: **1.** In fiber optics, a loss of optical power at a splice or connector, caused by a lateral, *i.e.*, transverse, offset of the mating fiber cores, which offset causes an imperfect transfer of the optical signal from the "transmitting" fiber to the "receiving" fiber. *Note:* The effect of a given amount of lateral offset will depend on other parameters such as the relative diameters of the respective cores. For example: if, because of manufacturing tolerances, the "transmitting" core is smaller than the "receiving" core, the effect will be less than if both cores were the same size. [After FAA] **2.** An analogous loss of optical power caused by lateral misalignment of the fiber and optical source. [FAA] *Synonym* **transverse offset loss.**

launch angle: 1. The angle, with respect to the normal, at which a light ray emerges from a surface. **2.** The beam divergence at an emitting surface, such as that of a light-emitting diode (LED), laser, lens, prism, or optical fiber end face. **3.** At an end face of an optical fiber, the angle between an input ray and the fiber axis. (188) *Note:* If the end face of the fiber is perpendicular to the fiber axis, the launch angle is equal to the incidence angle when the ray is external to the fiber and the refraction angle when initially inside the fiber.

launching fiber: An optical fiber used in conjunction with a source to excite the modes of another fiber in a particular fashion. *Note:* Launching fibers are most often used in test systems to improve the precision of measurements. *Synonym* **injection fiber.**

launch numerical aperture (LNA): The numerical aperture of an optical system used to couple (launch) power into an optical fiber. (188) *Note 1:* LNA may differ from the stated NA of a final focusing element if, for example, that element is underfilled or the focus is other than that for which the element is specified. *Note 2:* LNA is one of the parameters that determine the initial distribution of power among the modes of an optical fiber.

layer: 1. In radio wave propagation, *see* **F region. 2.** In telecommunications networks and open systems architecture, a group of related functions that are performed in a given level in a hierarchy of groups of related functions. *Note:* In specifying the functions for a given layer, the assumption is made that the specified functions for the layers below are performed, except for the lowest layer.

layered system: A system in which components are grouped, *i.e.*, layered, in a hierarchical arrangement, such that lower layers provide functions and services that support the functions and services of higher layers. *Note:* Systems of ever-increasing complexity and capability can be built by adding or changing the layers to improve overall system capability while using the components that are still in place.

lay length: In communications cables—including fiber-optic cables—having the transmission media wrapped helically around a central member, the longitudinal distance along the cable required for one complete helical wrap; *i.e.*, the total cable length divided by the total number of wraps. *Note 1:* In many fiber-optic cable designs, the lay length is shorter than in metallic cables of similar diameter, to avoid overstressing the fibers during the pulling associated with the installation operation. *Note 2:* The wraps, *i.e.*, turns, that are referred to should not be confused with the twists given twisted metallic pairs, *i.e.*, wires, to reduce electromagnetic coupling. Pairs of optical fibers are not given such twists. [After FAA] *Synonym* **pitch.**

LBO: *Abbreviation for* **line buildout.** *Synonym* **building out.**

LCD: *Abbreviation for* **liquid crystal display.**

LDM: *Abbreviation for* **limited distance modem.**

leaky bucket counter: A counter that is incremented by unity each time an event occurs and that is periodically decremented by a fixed value. (188)

leaky mode: In an optical fiber, a mode having a field that decays monotonically for a finite distance in the transverse direction but becomes oscillatory everywhere beyond that finite distance. *Note:* Leaky modes correspond to leaky rays in the terminology of geometric optics. Leaky modes experience attenuation, even if the waveguide is perfect in every respect. (188) *Synonym* **tunneling mode.**

leaky ray: In an optical fiber, a ray for which geometric optics would predict total internal reflection at the boundary between the core and the cladding, but which suffers loss by virtue of the curved core boundary. *Note:* Leaky rays correspond to leaky (*i.e.*, tunneling) modes in the terminology of mode descriptors. *Synonym* **tunneling ray**.

leap second: An occasional adjustment of one second, added to, or subtracted from, Coordinated Universal Time (UTC) to bring it into approximate synchronism with UT-1, which is the time scale based on the rotation of the Earth. (188) *Note 1:* Adjustments, when required, are made at the end of June 30, or preferably, December 31, Universal Time, so that UTC never deviates from UT-1 by more than 0.9 second. *Note 2:* The last minute of the day on which an adjustment is made has 61 or 59 seconds.

leased circuit: Dedicated common-carrier facilities and channel equipment used by a network to furnish exclusive private line service to a specific user or group of users.

least-time principle: *Synonym* **Fermat's principle.**

LEC: *Abbreviation for* **local exchange carrier.**

LED: *Abbreviation for* **light-emitting diode.**

left-hand (anti-clockwise) polarized wave: An elliptically or circularly polarized wave, in which the electric field vector, observed in the fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left-hand or anticlockwise direction. [NTIA] [RR]

leg: 1. A segment of an end-to-end route or path, such as a path from user to user via several networks and nodes within networks. *Note:* Examples of legs are several sequential microwave links between two switching centers and a transoceanic cable between two shore communications facilities, each connected to a node in a national network. **2.** A connection from a specific node to an addressable entity, such as communication link from a computer workstation to a hub.

level: 1. The absolute or relative voltage, current, or power at a particular point in a circuit or system. (188) **2.** A tier or layer of a hierarchical system, *e.g.*, the Link-Level protocol, high-level computer language. (188)

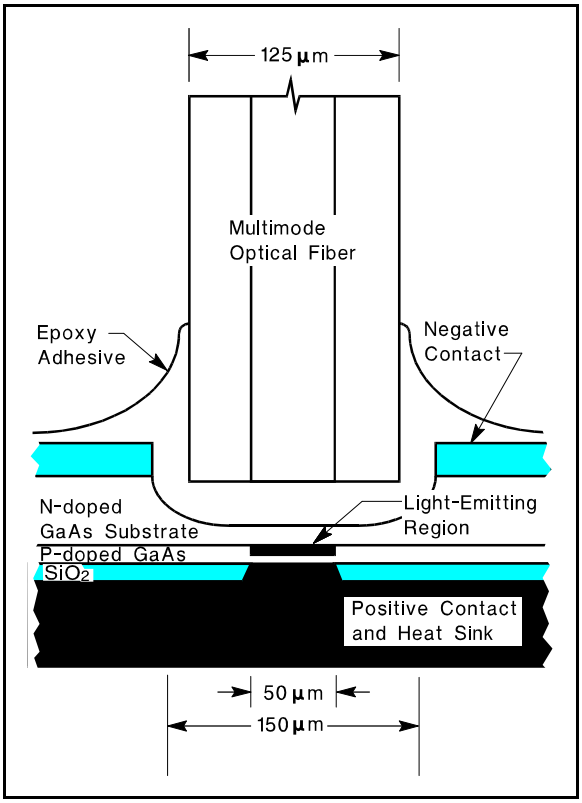
level alignment: The adjustment of transmission levels of single links and of links in tandem to prevent problems such as overloading of transmission subsystems. (188)

LF: *Abbreviation for* **low frequency.**

LIFO: *Acronym for* **last-in first-out.**

light: In a strict sense, the region of the electromagnetic spectrum that can be perceived by human vision, *i.e.*, the visible spectrum, which is approximately the wavelength range of 0.4 µm to 0.7 µm. (188) *Note 1:* In the laser and optical communications fields, custom and practice have extended usage of the term *light* to include the much broader portion of the electromagnetic spectrum that can be handled by the basic optical techniques used for the visible spectrum. *Note 2:* The region embraced by the term *light* has not been clearly defined, but by convention and usage, is considered to extend from the near-ultraviolet region of approximately 0.3 µm, through the visible region, and into the mid-infrared region to approximately 30 µm.

light-emitting diode (LED): A semiconductor device that emits incoherent optical radiation when biased in the forward direction. (188)



surface-emitting LED

lightguide: *See* **optical fiber.**

lightning down-conductor: In a lightning protection subsystem, the conductor connecting the air terminal or overhead ground wire to the earth electrode subsystem. (188)

lightning protection subsystem: All of the components used to protect a facility from the effects

of lightning. (188) *Note:* The lightning protection subsystem includes air terminals, lightning down-conductors, the earth electrode subsystem, air gaps, arresters, and their interconnections.

light pen: A stylus, usually hand-held, that contains a photodetector or light source, and that allows interaction with a computer through a specially designed monitor screen.

light valve: *Synonym* **optical switch.**

limited protection: A form of short-term communications security applied to the electromagnetic or acoustic transmission of unclassified information that warrants a degree of protection against simple analysis and easy exploitation but that does not warrant protection to the extent needed for security of classified information. (188)

limited-protection voice equipment: Equipment that provides limited security for unclassified voice communications. (188)

limiter: A device in which the voltage or some other characteristic of the output signal is automatically prevented from exceeding a specified value. (188)

limiter circuit: A circuit of nonlinear elements that restricts the electrical excursion of a variable in accordance with specified criteria. (188)

limiting: Any process by which a specified characteristic (usually amplitude) of the output of a device is prevented from exceeding a predetermined value. (188) *Note 1: Hard limiting ("clipping")* is a limiting action in which there is (a) over the permitted dynamic range, negligible variation in the expected characteristic of the output signal, and (b) a steady-state signal, at the maximum permitted level, for the duration of each period when the output would otherwise be required to exceed the permitted dynamic range in order to correspond to the transfer function of the device. *Note 2: Soft limiting* is limiting in which the transfer function of a device is a function of its instantaneous or integrated output level. The output waveform is therefore distorted, but not clipped.

limits of interference: In radio transmission, the maximum permissible interference as specified in recommendations of the International Special Committee on Radio Interference or other recognized authority. (188)

line: 1. A physical medium for transferring electrical or electromagnetic energy from one point to another for purposes of communications. (188) **2.** A land line. **3.** A metallic medium used for the transmission of electrical power. **4.** *See* **scanning line.**

line adapter circuit: *See* **four-wire terminating set.**

linear analog control: *Synonym* **linear analog synchronization.**

linear analog synchronization: Synchronization in which the functional relationships used to obtain synchronization are of simple proportionality. *Synonym* **linear analog control.**

linear combiner: A diversity combiner in which the combining consists of simple addition of two or more signals. (188)

linear device: A device for which the output is, within a given dynamic range, linearly proportional to the input.

linearity: The property of a system in which, if input signals X and Y result in system output $S(X)$ and $S(Y)$ respectively, the input signal $aX + bY$ will result in the output $aS(X) + bS(Y)$, where S is the system transfer function and a and b are scalars.

linearly polarized (LP) mode: A mode for which the field components in the direction of propagation are small compared to components perpendicular to that direction. *Note:* The LP description is an approximation that is valid for a weakly guiding optical fiber, including typical telecommunications grade fibers.

linear network: *See* **network topology.**

linear optimization: *Synonym* **linear programming.**

linear polarization: Of an electromagnetic wave, confinement of the E-field vector or H-field vector to

a given plane. *Note:* Historically, the orientation of a polarized electromagnetic wave has been defined in the optical regime by the orientation of the electric vector, and in the radio regime, by the orientation of the magnetic vector. *Synonym* **plane polarization.**

linear predictive coding (LPC): A method of digitally encoding analog signals, which method uses a single-level or multilevel sampling system in which the value of the signal at each sample time is predicted to be a linear function of the past values of the quantized signal. *Note:* LPC is related to adaptive predictive coding (APC) in that both use adaptive predictors. However, LPC uses more prediction coefficients to permit use of a lower information bit rate than APC, and thus requires a more complex processor.

linear programming (LP): In operations research, a procedure for locating the maximum or minimum of a linear function of variables that are subject to linear constraints. *Synonym* **linear optimization.**

linear topology: *See* **network topology.**

line balance: The degree of electrical similarity of the two conductors of a transmission line. (188) *Note:* A high degree of line balance reduces pickup of extraneous disturbances of all kinds, including crosstalk.

line buildout (LBO): *Synonym* **building out.**

line code: A code chosen for use within a communications system for transmission purposes. (188) *Note 1:* A line code may differ from the code generated at a user terminal, and thus may require translation. *Note 2:* A line code may, for example, reflect a requirement of the transmission medium, *e.g.*, optical fiber versus shielded twisted pair.

line driver: An amplifier used to enhance the transmission reliability of a usually digital intrafacility metallic transmission line, over extended distances, by driving the input to the transmission line with a higher than normal signal level. *Note:* An example of a line driver is an amplifier used to extend the range of an RS-232C digital signal beyond 50 feet (~15 m) while maintaining a specified bit-error ratio.

line filter balance: A network designed to maintain phantom group balance when one side of the group is equipped with a carrier system. (188) *Note:* Since it must balance the phantom group for only voice frequencies, the line filter balance configuration is usually simple compared with the filter that it balances.

line hit: *See* **hit.**

line load control: A network-provided service feature that allows selective denial of call origination to certain lines when excessive demands for service are required of a switching center. (188)

line loop: *See* **loop.**

line-of-sight (LOS) propagation: Of an electromagnetic wave, propagation in which the direct ray from the transmitter to the receiver is unobstructed, *i.e.,* the transmission path is not established by or dependent upon reflection or diffraction. *Note:* The need for LOS propagation is most critical at VHF and higher frequencies.

line-route map: A map or overlay for signal communications operations that shows the actual routes and types of construction of wire circuits in the field. It also gives the locations of switchboards and telegraph stations. [JP1]

line side: The portion of a device that is connected to external, *i.e.*, outside plant, facilities such as trunks, local loops, and channels.

line source: 1. In spectroscopy, an optical source that emits one or more spectrally narrow lines as opposed to a continuous spectrum. **2.** In the geometric sense, an optical source having an emitting area in the form of a spatially narrow line, *e.g.*, a slit. *Synonym* **slit source.**

line spectrum: In optics, an emission or absorption spectrum consisting of one or more narrow spectral lines, as opposed to a continuous spectrum.

line speed: *See* **modulation rate.**

line-to-line correlation: In facsimile, the correlation of object information from scanning line to scanning

line. *Note:* Line-to-line correlation is used in two-dimensional encoding.

line traffic coordinator (LTC): In a DDN switching center, the processor that controls traffic on a line. (188)

line verification: *See* **busy verification.**

linewidth: *See* **spectral width.**

link: **1.** The communications facilities between adjacent nodes of a network. (188) **2.** A portion of a circuit connected in tandem with, *i.e.*, in series with, other portions. **3.** A radio path between two points, called a radio link. (188) **4.** In communications, a general term used to indicate the existence of communications facilities between two points. [JP1] **5.** A conceptual circuit, *i.e.*, logical circuit, between two users of a network, that enables the users to communicate, even when different physical paths are used. *Note 1:* In all cases, the type of link, such as data link, downlink, duplex link, fiber optic link, line-of-sight link, point-to-point link, radio link and satellite link, should be identified. *Note 2:* A link may be simplex, half-duplex, or duplex. **6.** In a computer program, a part, such as a single instruction or address, that passes control and parameters between separate portions of the program. **7.** In hypertext, the logical connection between discrete units of data.

link encryption: The application of on-line crypto-operation to a link of a communications system so that all information passing over the link is encrypted in its entirety. [JP1]

linking protection (LP): In adaptive high-frequency (HF) radio, protection intended to prevent the establishment of unauthorized links or the unauthorized manipulation of legitimate links, and which are administered through an authorization process. [After FED-STD-1049/1]

Link Layer: *Deprecated term for* **Data Link Layer.** *See* **Open Systems Interconnection—Reference Model.**

link level: In the hierarchical structure of a primary or secondary station, the conceptual level of control or data processing logic that controls the data link. *Note:* Link-level functions provide an interface between the station high-level logic and the data link. Link-level functions include (a) transmit bit injection and receive bit extraction, (b) address and control field interpretation, (c) command response generation, transmission and interpretation, and (d) frame check sequence computation and interpretation.

link orderwire: A voice or data communications circuit that (a) serves as a transmission link between adjacent communications facilities that are interconnected by a transmission link and (b) is used only for coordination and control of link activities, such as traffic monitoring and traffic control. (188)

link protocol: A set of rules relating to data communications over a data link. *Note:* Link protocols define data link parameters, such as transmission code, transmission mode, control procedures, and recovery procedures.

link quality analysis (LQA): In adaptive high-frequency (HF) radio, the overall process by which measurements of signal quality are made, assessed, and analyzed. *Note 1:* In LQA, signal quality is determined by measuring, assessing, and analyzing link parameters, such as bit error ratio (BER), and the levels of the ratio of signal-plus-noise-plus-distortion to noise-plus-distortion (SINAD). Measurements are stored at—and exchanged between—stations, for use in making decisions about link establishment. *Note 2:* For adaptive HF radio, LQA is automatically performed and is usually based on analyses of pseudo-BERs and SINAD readings.

lip synchronization: The synchronization of audio and corresponding video signals so that there is no noticeable lack of simultaneity between them. (188) *Note:* An example of a lip synchronization problem is the case in which television video and audio signals are transported via different facilities *(e.g.*, a geosynchronous satellite link and a landline) that have significantly differently delay times, respectively. In such cases it is necessary to delay the audio electronically to allow for the difference in propagation times.

liquid crystal display (LCD): A display device that creates characters by means of the action of electrical signals on a matrix of liquid cells that become opaque

when energized. *Note:* A liquid crystal display may be designed to be viewed by reflected or transmitted light.

LLC: *Abbreviation for* **logical link control.** *See* **logical link control sublayer.**

LNA: *Abbreviation for* **launch numerical aperture.**

load: 1. The power consumed by a device or circuit in performing its function. (188) **2.** A power-consuming device connected to a circuit. (188) **3.** To enter data or programs into storage or working registers. (188) **4.** To insert data values into a database that previously contained no occurrences of data. **5.** To place a magnetic tape reel on a tape drive, or to place cards into the card hopper of a card punch or reader. (188)

load capacity: In pulse-code modulation (PCM), the level of a sinusoidal signal that has positive and negative peaks that coincide with the positive and negative virtual decision values of the encoder. *Note:* Load capacity is usually expressed in dBm0. *Synonym* **overload point.**

loader: A routine that reads data into main storage.

load factor: The ratio of the average load over a designated period of time to the peak load occurring during that period. (188)

loading: 1. The insertion of impedance into a circuit to change the characteristics of the circuit. (188) **2.** In multichannel communications systems, the insertion of white noise or equivalent dummy traffic at a specified level to simulate system traffic and thus enable analysis of system performance. (188) **3.** In telephone systems, the load, *i.e.*, power level, imposed by the busy hour traffic. *Note 1:* The loading may be expressed as (a) the equivalent mean power and the peak power as a function of the number of voice channels or (b) the equivalent power of a multichannel complex or signal composite referred to zero transmission level point (0TLP). *Note 2:* Loading is a function of the number of channels and the specified voice channel mean power. (188)

loading characteristic: In multichannel telephone systems, a plot, for the busy hour, of the equivalent mean power and the peak power as a function of the number of voice channels. (188) *Note:* The equivalent power of a multichannel signal referred to the zero transmission level point is a function of the number of channels and has for its basis a specified voice channel mean power.

loading coil: A coil that does not provide coupling to any other circuit, but is inserted in a circuit to increase its inductance. (188) *Note 1:* Loading coils inserted periodically in a pair of wires reduce the attenuation at the higher voice frequencies up to the cutoff frequency of the low-pass filter formed by (a) the inductance of the coils and distributed inductance of the wires, and (b) the distributed capacitance between the wires. Above the cutoff frequency, attenuation increases rapidly. *Note 2:* A common application of loading coils is to improve the voice-frequency amplitude response characteristics of twisted cable pairs. When connected across a twisted pair at regular intervals, loading coils, in concert with the distributed resistance and capacitance of the pair, form an audio-frequency filter that improves the high-frequency audio response of the pair. *Note 3:* When loading coils are in place, signal attenuation increases rapidly for frequencies above the audio cutoff frequency. Thus, when a pair is used to support applications that require higher frequencies, such as carrier systems, loading coils must be absent.

lobe: 1. An identifiable segment of an antenna radiation pattern. *Note:* A lobe is characterized by a localized maximum bounded by identifiable nulls. **2.** A pair of channels between a data station and a lobe attaching unit, one channel for sending and one for receiving, as seen from the point of view of the attached data station.

lobe attaching unit: In a ring network, a functional unit used to connect and disconnect data stations to and from the ring without disrupting network operations.

local access and transport area (LATA): Under the terms of the Modification of Final Judgment (MFJ), a geographical area within which a divested Bell Operating Company (BOC) is permitted to offer exchange telecommunications and exchange access services. *Note:* Under the terms of the MFJ, the BOCs are generally prohibited from providing

services that originate in one LATA and terminate in another.

local area network (LAN): A data communications system that (a) lies within a limited spatial area, (b) has a specific user group, (c) has a specific topology, and (d) is not a public switched telecommunications network, but may be connected to one. (188) *Note 1:* LANs are usually restricted to relatively small areas, such as rooms, buildings, ships, and aircraft. *Note 2:* An interconnection of LANs within a limited geographical area, such as a military base, is commonly referred to as a campus area network. An interconnection of LANs over a city-wide geographical area is commonly called a metropolitan area network (MAN). An interconnection of LANs over large geographical areas, such as nationwide, is commonly called a wide area network (WAN). *Note 3:* LANs are not subject to public telecommunications regulations.

local battery: 1. In telegraphy, the source of power that actuates the telegraphic station recording instruments, as distinguished from the source of power that furnishes current to the line. (188) **2.** In telephony, a system in which each telephone instrument has its own source of power, as opposed to being powered from the central office. (188) **3.** A source of local power for a telephone instrument.

local call: 1. Any call using a single switching facility. (188) **2.** Any call for which an additional charge, *i.e.*, toll charge, is not made to the calling or called party. *Note:* Calls such as those via "800" numbers do not qualify as local calls, because the called party is charged.

local central office: *Synonym* **central office.**

local clock: A source of timing located in close proximity to an associated facility, such as a communications station, central office, or node. *Note:* The same clock might be a remote clock relative to some other facility.

local exchange: *Synonym* **central office.**

local exchange carrier (LEC): A local telephone company, *i.e.*, a communications common carrier that provides ordinary local voice-grade telecommunications service under regulation within a specified service area.

local exchange loop: An interconnection between customer premises equipment and telephone central office.

local line: *See* **loop.**

local loop: *Synonym* **loop.**

local measured service: *See* **measured-rate service.**

local office: *Synonym* **central office.**

local orderwire: A communications circuit between a technical control facility and selected terminal or repeater locations within the communications complex. (188) *Note:* In multichannel radio systems, the local orderwire is usually a handset connection at the radio location.

local side: The portion of a device that is connected to internal facilities, such as switches, patch panels, test bays and supervisory equipment. (188)

lock-in frequency: A frequency at which a closed-loop system can acquire and track a signal. *See* **lock-in range.**

lock-in range: 1. The range of frequencies within which a closed-loop system can aquire and track a signal. (188) **2.** The dynamic range within which a closed-loop system can aquire and track a signal.

lockout: 1. In telephone systems, treatment of a user's line or trunk that is in trouble, or in a permanent off-hook condition, by automatically disconnecting the line from the switching equipment. (188) **2.** In public telephone systems, a process that denies an attendant or other users the ability to reenter an established connection. **3.** In a telephone circuit controlled by two voice-operated devices, the inability of one or both users to get through, either because of excessive local circuit noise or because of continuous speech from either or both users. (188) **4.** In mobile communications, an arrangement of control circuits whereby only one receiver can feed the system at a time. (188) *Synonym* **receiver lockout system.**

5. An arrangement for restricting access to use of all, or part of, a computer system. *Synonym* **protection.**

log: *Synonym* **journal.**

logical circuit: *Synonym* **virtual circuit.**

logical link control (LLC) sublayer: In a local-area-network/metropolitan-area-network (LAN/MAN) system, the part of the link level that (a) supports medium-independent data link functions and (b) uses the services of the medium access control sublayer to provide services to the network layer.

logical route: *Synonym* **virtual circuit.**

logical signaling channel: A logical channel that provides a signaling path within an information channel or within a physical signaling channel.

logical topology: Of a network, the schematic configuration that reflects the network's function, use, or implementation without regard to the physical interconnection of network elements.

log in: To perform a login procedure. *Synonym* **log on.**

login: The procedure that is followed by a user in beginning a session, *e.g.*, a period of terminal operation. *Synonym* **logon.**

log off: To perform a log-off procedure. *Synonym* **log out.**

log-off: The procedure that is followed by a user in closing a session, *e.g.*, a period of terminal operation. *Synonym* **log-out.**

logon: *Synonym* **login.**

log on: *Synonym* **log in.**

log out: *Synonym* **log off.**

log-periodic (LP) antenna: A broadband, multielement, unidirectional, narrow-beam antenna that has impedance and radiation characteristics that are regularly repetitive as a logarithmic function of the excitation frequency. *Note:* The length and spacing of the elements of a log-periodic antenna increase logarithmically from one end to the other. *Synonym* **log-periodic array.** (188)

log-periodic (LP) array: *Synonym* **log-periodic antenna.**

long-distance call: Any telephone call to a destination outside the local service area of the calling station, whether inter-LATA or intra-LATA, and for which there is a charge beyond that for basic service. *Synonym* **toll call.**

long-haul communications: 1. In public switched networks, pertaining to circuits that span large distances, such as the circuits in inter-LATA, interstate, and international communications. **2.** In the military community, communications among users on a national or worldwide basis. *Note 1:* Compared to tactical communications, long-haul communications are characterized by (a) higher levels of users, such as the National Command Authority, (b) more stringent performance requirements, such as higher quality circuits, (c) longer distances between users, including world wide distances, (d) higher traffic volumes and densities, (e) larger switches and trunk cross sections, and (f) fixed and recoverable assets. *Note 2: "Long-haul communications"* usually pertains to the U.S. Defense Communications System. (188)

longitudinal balance: 1. The electrical symmetry, with respect to ground, of the two wires of a pair (188) **2.** An expression of the difference in impedance of the two sides of a circuit.

longitudinal offset loss*: Synonym* **gap loss.**

longitudinal redundancy check (LRC): A system of error control based on the formation of a block check following preset rules. *Note 1:* The block check formation rules are applied in the same manner to each character. (188) *Note 2:* A combination of longitudinal and vertical redundancy check allows the detection and correction of single bit errors. *Synonym* **horizontal redundancy check.**

longitudinal voltage: A voltage induced or appearing along the length of a transmission medium. *Note 1:* Longitudinal voltage may be effectively eliminated by using differential amplifiers or receivers that respond only to voltage differences, *e.g.*, those between the

wires that constitute a pair. *Note 2:* Induced longitudinal voltages at low (power-line) frequencies can be greatly reduced by twisting parallel wires to create what are referred to as "*twisted wire pairs.*" *Synonym* **common-mode voltage.**

long line: A transmission line in a long-distance communications network. (188) *Note:* Examples of long lines are TDM and FDM carrier systems, microwave radio links, geosynchronous satellite links, underground cables, aerial cables and open wire, and submarine cables.

long-range aid to navigation (loran) system: *See* **loran.**

long-range radio aid to navigation system: *See* **loran.**

long-term stability: Of an oscillator, the degree of uniformity of frequency over time, when the frequency is measured under identical environmental conditions, such as supply voltage, load, and temperature. *Note:* Long-term frequency changes are caused by changes in the oscillator elements that determine frequency, such as crystal drift, inductance changes, and capacitance changes. (188)

long wavelength: In fiber optic communications, pertaining to optical wavelengths greater than ≈ 1 µm.

look-ahead-for-busy (LFB) information: Information concerning network resources available to support higher precedence calls. *Note 1:* Available resources include idle circuits and circuits used for lower precedence calls. *Note 2:* LFB information may be used to make call-path reservations.

loop: 1. A communications channel from a switching center or an individual message distribution point to the user terminal. (188) *Synonym* **subscriber line. 2.** In telephone systems, a pair of wires from a central office to a subscriber's telephone. (188) *Synonyms* **local loop, user line. 3.** Go-and-return conductors of an electric circuit; a closed circuit. **4.** A closed path under measurement in a resistance test. **5.** A type of antenna, in the form of a circle or rectangle, usually used in direction-finding equipment and in UHF reception. (188) **6**. A sequence of instructions that may be executed iteratively while a certain condition prevails until the loop has been executed once.

loop-back: 1. A method of performing transmission tests of access lines from the serving switching center, which method usually does not require the assistance of personnel at the served terminal. (188) **2.** A method of testing between stations (not necessarily adjacent) wherein two lines are used, with the testing being done at one station and the two lines interconnected at the distant station. (188) **3.** A patch, applied manually or automatically, remotely or locally, that facilitates a loop-back test.

loop check: *Synonym* **echo check.**

looped dual bus: A distributed-queue dual-bus (DQDB) scheme in which the head-of-bus functions for both buses are at the same location.

loop filter: In a phase-locked loop, a filter located between the phase detector (or time discriminator) and the voltage controlled oscillator (or phase shifter).

loop gain: 1. The total usable power gain of a carrier terminal or two-wire repeater. *Note:* The maximum usable gain is determined by, and may not exceed, the losses in the closed path. **2.** The sum of the gains, expressed in dB, acting on a signal passing around a closed path, *i.e.*, a loop. (188)

loop noise: The noise contributed by one or both loops of a telephone circuit to the total circuit noise. (188) *Note:* In a given case, it should be stated whether the loop noise is for one or both loops.

loop start: A supervisory signal given by a telephone or PBX in response to completing the loop path.

loop test: A test that uses a closed circuit, *i.e.*, loop, to detect and locate faults. (188)

loop transmission: Multipoint transmission in which (a) all the stations in a network are serially connected in one closed loop, (b) there are no cross-connections, (c) the stations serve as regenerative repeaters, forwarding messages around the loop until they arrive at their destination stations, and (d) any station can introduce a message into the loop by interleaving it with other messages. [From Weik '89]

loose buffer: *See* **buffer.**

loran: *Acronym for* **long-range radio navigation**. A long-range radio navigation position-fixing system consisting of an array of fixed stations that transmit precisely synchronized signals to mobile receivers. *Note:* A loran receiver measures differences in the times of arrival of the signals from the various stations. A fixed difference in the time of arrival of the signals from any two stations will define a hyperbolic arc on which the receiver must lie. Three or more stations are needed to remove ambiguities in the position of the receiver. *Synonyms* **long-range aid to navigation system, long-range radio aid to navigation system.**

loran station: A long distance radionavigation land station transmitting synchronized pulses. Hyperbolic lines of position are determined by the measurement of the difference in the time of arrival of these pulses. [NTIA]

LOS: *Abbreviation for* **line of sight.** *See* **line-of-sight propagation.**

loss: 1. The diminution, usually expressed in dB, of signal level in a communications medium. (188) **2.** The power, usually expressed in watts, consumed by a circuit or component. (188) **3.** The energy dissipated without accomplishing useful work or purpose.

lossy medium: A medium in which a significant amount of the energy of a propagating electromagnetic wave is absorbed per unit distance traveled by the wave. [After 2196]

lost block: A block not delivered to the user within a specified maximum end-to-end block transfer time.

lost call: A call that has not been completed for any reason other than cases where the call receiver (termination) is busy. (188)

lower frequency ground: *Deprecated term. See* **facility grounding system.**

lowest usable high frequency (LUF): The lowest frequency in the HF band at which the received field intensity is sufficient to provide the required signal-to-noise ratio for a specified time period, *e.g.*, 0100 to 0200 UTC, on 90% of the undisturbed days of the month. (188)

low frequency (LF): Any frequency in the band from 30 kHz to 300 kHz. (188)

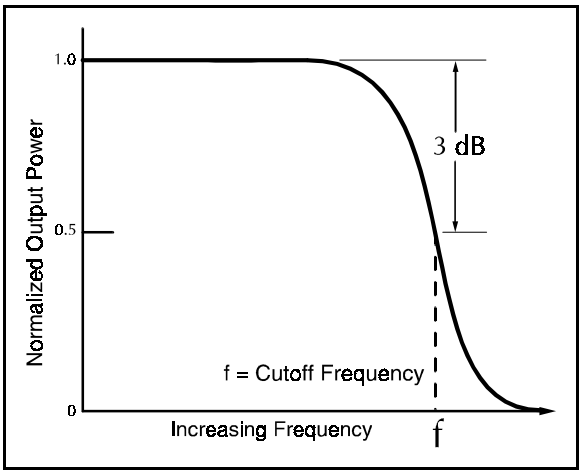
low-level keying: *Synonym* **low-level signaling.**

low-level language: *Synonym* **computer-oriented language.**

low-level modulation: Modulation of a signal, *e.g.*, a carrier, at a point in a system or device, such as a radio transmitter, where the power level is low compared to the final output power. (188)

low-level signaling: The use on signal lines of voltage levels that are between the limits of positive and negative 6 volts. (188) *Synonym* **low-level keying.**

low-pass filter: A filter network that passes all frequencies below a specified frequency with little or no loss, but strongly attenuates higher frequencies. (188)



low pass filter

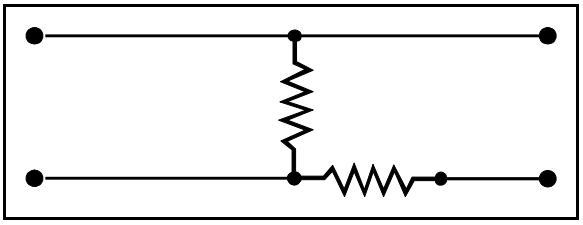
low-performance equipment: 1. Equipment that has imprecise characteristics that do not meet system reliability requirements. **2.** In military communications, equipment that has insufficiently exacting characteristics to permit its use in trunks or links. (188) *Note:* Low-performance equipment may be used in loops if it meets loop performance requirements. **3.** Tactical ground and airborne equipment that (a) has size, weight, and complexity

characteristics that must be kept to a minimum and (b) is used in systems that have components with similar minimum performance characteristics. (188)

low-power communication device: A restricted radiation device, exclusive of those employing conducted or guided radio frequency techniques, used for the transmission of signs, signals (including control signals), writing, images and sounds or intelligence of any nature by radiation of electromagnetic energy. Examples: Wireless microphone, phonograph oscillator, radio-controlled garage door opener, and radio-controlled models. [NTIA]

LP: *Abbreviation for* **linear programming, linking protection.**

L-pad: A pad composed of two discrete components, one series component and one shunt component. *Note:* In schematic representation, the components resemble the upper-case letter "L,"hence the name. (188)



L-pad

LPC: *Abbreviation for* **linear predictive coding.**

LP mode: *Abbreviation for* **linearly polarized mode.**

LP_{01} mode: Designation of the fundamental LP mode. *See* **fundamental mode.**

LQA: *Abbreviation for* **link quality analysis.**

LRC: *Abbreviation for* **longitudinal redundancy check.**

LSB: *Abbreviation for* **least significant bit, lower sideband.**

LTC: *Abbreviation for* **line traffic coordinator.**

LUF: *Acronym for* **lowest usable high frequency.**

luminescent diode: *See* **superluminescent LED.**

lynx: A World Wide Web browser that provides a character-based user interface to hypertext-based information. *Note:* Lynx can display only character-based portions of the hypertext-based information.

(this page intentionally left blank)